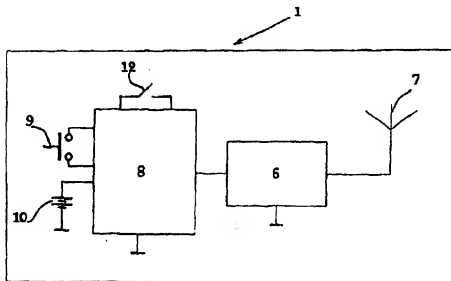




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(71)(72) Applicants and Inventors: VLČEK, Miroslav [CZ/CZ]; Bayerova 2, 602 00 Brno (CZ); GILL, Radomir [CZ/CZ]; Neužilova 2, 625 00 Brno (CZ).			
(74) Agent: KANIA, František; Mendlovo náměstí 1a, 603 00 Brno (CZ).			

(54) Title: A DEVICE FOR WIRELESS SWITCHING OF ILLUMINATION BODIES



(57) Abstract

A device for wireless switching of illumination bodies above all in flats and other enclosed rooms, formed by at least one door controller (1) and at least one actuator (4), fastened on at least one side of a door body (2, 2a, 2b, 2c, 2d) and mounted in the door controller (1) are a high-frequency modulator (6) with a transmitting antenna (7) connected with a code selector (8), a switch (9) of the actuator (4) and a power source, while within the range of the waves from the high-frequency modulator (6) is situated at least one performance unit (14), containing a high-frequency demodulator (15) with a receiving antenna (16), connected with an analyzing member (17) and with a switching member (18), connected to the electric circuit of at least one illumination body (20, 20a, 20b, 20c).

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Description

A Device for Wireless Switching of Illumination Bodies

Technical Field

The invention relates to a device for wireless switching of illumination bodies, above all in flats and other enclosed rooms.

Background Art of the Invention

Electrical illumination bodies in flats and in rooms inside buildings are mostly controlled by push-button switches, roughly called "switches", incorporated in the circuits of the leads installed to individual illumination devices, independently on the particular kind and design of the latter. Under the existing background art the illumination body switches, generally of push-button or sensor concept, are situated directly on the room walls in a close proximity of the door, thus within the reach of the entering person. For the illumination of pass-through rooms having several entrance doors, the problem how to switch the respective illumination body circuit as required in the room without the user being compelled to return to the same switch of his original entrance door, has already been solved in the world long ago. A currently used solution is so-called cross-coupling of illumination body conductors, serving for inverting the current direction in the circuit without an OFF condition. The user simply switches ON and OFF the illumination of a room by a switch situated near any of several entrances, which can, however, be up to three only under the existing solutions. A constant and general limitation of the described installation is a practically variable position of push-button switches near the door, so that,

above all in darkness, the entering person is obliged to grope with his hand on the wall for the switch to be found. This is very inconvenient and impractical especially in the rooms unknown yet to the entering person. There exist, no doubt, such illumination switches, which are fitted with glow-lamps, having a negligible power intake and signalling without interruption the switch position. This kind of switches with a constant light acts rather disturbing in a private residential room and is therefore mostly used in public or common corridors and staircases. In addition to the mentioned inconvenience there exists still another limitation of these switches, also in the case of their cross-coupling, viz. they can only be used in the rooms in the walls of which such leads have already been installed. If, however, an alternative or cumulative switching of more illumination devices such as e.g. large chandeliers and lustres is required, additional parallel conductor lines with special switches are necessary. They are used e.g. for amplifying the illumination intensity in rooms. Such installations require mounting a large number of conductors into the walls. Known are, no doubt, also the switches for exceptional illumination bodies conceived on the principle of a pocket-size high-frequency wave generators with a fixed signal transmitted to a high-frequency receiver embodied in the illumination device, e.g. for switching night lamps or emergency illumination bulbs. These are, however, distance switches analogous to the TV controllers etc. whose function cannot be integrated into standard illumination installations of rooms intended for a general use, and that is why they are of an exceptional and individual applicability only.

Disclosure of the invention

The said inconvenience is substantially remedied by a device for a wireless switching of illumination bodies above all in flats and other rooms. the principle whereof is in that at least one door controller and at least one actuator are attached to at least one side of a door body, and in the door controller a high-frequency modulator with a transmitting antenna is fitted and connected with a code selector, further an actuator switch and a power source, while within the action range of the waves of the high-frequency modulator at least one performance unit is situated, containing a high-frequency demodulator with a receiver antenna connected with an analyzing member and a switching member, the latter being connected with the electric circuit of at least one illumination body.

The device according to the invention enables, on the basis of a corresponding selection of a modulated coded signal, for which also the analyzing member of the high-frequency wave demodulator in the performing unit has been preset, to switch ON and OFF by means of an actuator independently as well as in parallel several illuminating bodies in one or in several rooms. The actuator, which can be handled merely by a tipping with the upside of the fingers of one hand, is placed quite closely to the door lock and no illumination switch has to be blindly groped for in a darkness around the room door. The person intending to enter a room has a possibility of switching on the room illumination in advance and at the same time while opening the door, still before entering the room.

To still improve the device efficiency, it is of advantage to place the door controller together with the actuator on both sides of the door body, preferably

below the handle of the door lock. The actuator switch circuit can be combined with a circuit of an arresting member, consisting of a reed relay contact and a permanent magnet. The actuator can be designed as a conventional push-button switch or as a contact sensor with an analogous function. In the analysing member circuit of the performance unit an ambient illumination pickup can be incorporated, disabling the performance unit if a sufficient daylight intensity is in the room. In the case that also a standard wiring for the illumination body controlled by a conventional push-button is installed on the wall, it is possible to connect the performance unit instead of the conventional wall push-button, while the electromechanical function of the switch is maintained in combination with the performance unit. Depending on existing specific conditions, the high-frequency modulator mounted in the door controller can be a transmitter of RF, IR or UHF waves.

Survey of pictures in the drawings

The invention will be nearer explained by means of the drawings among which Fig. 1 presents the outer view of a door controller with an actuator below the door lock handle with the actuating position of man's hand, Fig. 2 a schematic view of the door controller assembly, Fig. 3 a schematic view of a door body with the door controller and actuator connected with an arresting member, Fig. 4 a schematic view of the performance unit assembly with an ambience illumination sensor, Fig. 5 a schematic view of the assembly from Fig. 4 connected with conventional conductors and with a standard illumination body switch, and Fig. 6 a schematic plane view of an installation of both-sides arrangement of the twin door controller in two connected rooms having several doors.

Examples of embodiment of the invention

The device according to Fig. 1 consists of a door controller 1, mounted on the door body 2 close to the door lock 3. To the upper part of the door control 1 an actuator 4 is attached and situated directly below the body of the handle 5 of the door lock 3. The actuator 4 is either a push-button switch of a simple make and design with a return spring (not shown), or a contact sensor of a conventional make, fulfilling an analogous function. According to Fig. 2, the door controller 1 forms an enclosed assembly, containing its substantial parts, being above all a frequency modulator 6 of an electronic type, fitted with a transmitter antenna 7 and further a code selector 8, whose function is providing for a signal code preset earlier. The high-frequency modulator 6 is substantially a wave transmitter with a local range. To the code selector 8 a switch 9 of the actuator 4 is connected, performing an analogous function as if a conventional push-button switch or a contact sensor is used (not shown) as current components. To the code selector 8 a power source 10 is further connected, represented in the demonstration case by an electrochemical battery, feeding power for the whole door controller 1. According to Fig. 3 the circuit of the actuator 4 is connected with an arresting member 11, consisting of a contact 12 of a reed-type relay, situated in the door body 2, and of a permanent magnet 13, situated in an opposite position outside of the door body 2. The function of the arresting member 11 as a whole is to disable the circuit of the actuator 4 when the door 2 is closed. This prevents any activating of the door controller 1 by an unwanted person from outside even if the door 2 is closed. The arresting member 11 can be of any other design e.g. having a direct connection (not shown) with the mechanism of the door lock 3. According to Fig. 4 still

another substantial part of the device according to the invention is a performance unit 14, situated at any position in the room to be illuminated, but anyway, within the wave range of the high-frequency modulator 6, situated in the door controller 1. Said performance unit 14 consists of a high-frequency demodulator 15, representing together with the receiver antenna 16 roughly a high-frequency wave receiver. Another substantial part of the performance unit 14 is an analyzing member 17, serving for decoding of the signals from the high-frequency modulator 6, and whose function is transforming the code signal in an electric pulse for the switching member 18. The latter forms the last part of the performance unit 14 and its output is connected with a conductor 19 of an illumination body 20, into which it switches the feeding current by means of a triac member having a function of a two-way triode thyristor or of any other commutating element known in the electric technology. According to Fig. 5 the performance unit 14 is connected into a circuit of a conventional line 19 to the illumination body 20. The use of a conventional push-button switch 21 situated on the room wall is made possible by its connecting to the analyzing member 17. To the same member also the ambience illumination sensor 22 can be connected, responding to a preset illumination intensity in a given room and leaving the circuit of the analyzing member 17 disconnected and the illuminating body 20 OFF, if the natural illumination of the room is just sufficient.

The function of the device is apparent from Fig. 6. The person entering the room 23 e.g. through the door 2 activates, when opening the door, by the backhand one of the twin actuators 4 tuned up for the signals of a modulated code A1-A2, by the fact of which activation that actuator 4 has been used as the main one, and this

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signal results in a wave field in the corresponding door controller 1. The said coded signal is received by the receiver antenna 16 of the frequency modulator 15 in the performance unit 14, and it is transmitted to the analyzing member 17, from which the pulse is further transmitted to the switching member 18, which will switch the circuit of the illumination body 20, situated in the room 23. And then, when this person leaves the room through the same door 2, he will use for switching off the illumination body 20 the same actuator 4 from the twin assembly on the outer side of door 2, thereby defined as a main actuator. The actuator 4 defined as a secondary one, would represent in the given situation one part of the twin actuators for code signals B1 - B2 and the said person in the room 23 would use it alternatively only if he wants to switch the illumination body 20 without leaving the room 23 and without opening the door 2. By such an alternative use of the system the signal field B1 or B2, as may be, is generated, and the analyzing member 17 transmits in the way described above a pulse for the switching member 18 to cut the circuit of the illuminating body 20. The same effect can be obtained also when entering the room 23 through other doors 2a, 2b or 2c, and the other way about, when leaving the room, by means of code signals C1-C2, D1-D2, E1-E2, F1-F2, G1-G2, H1-H2, I1-I2 and J1-J2, which also comprises the entering or leaving through the door 2d into another room 24 with illumination bodies 20a, 20b and 20c, connected to the analyzing units 14a, 14b and 14c. The same is valid also when using the door 2c. Duplicating the door controllers 1 and actuators 4 in twin assemblies is not limiting and even more such door controllers 1 and actuators 4 may be installed on both sides of the doors 2, 2a, 2b, 2c and 2d. It is possible

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to switch by them even more illuminating bodies fully deliberately even in a larger number of rooms, which depends on a corresponding selection of a code signal. The system can also be used for a timed illumination of the connected rooms by incorporating a timer into the circuit of the analyzing member 17, or into the switching member 18, which is purposeful when only passing through said rooms.

Industrial applicability

The device according to the invention can be used practically in all enclosed rooms and spaces not only in flats, hotel rooms and hostels, but with the same efficiency also in offices and public buildings, in industrial premises, hospitals and schools. They can be adapted also for the use on doors fitted with various types of locks including those electronically controlled e.g. by means of code cards or similar elements.

Claims

1. A device for wireless switching of illumination bodies above all in flats and other enclosed rooms, consisting of a high-frequency signal generator and a receiver of said high-frequency signals connected with a switch of illumination bodies, characterized in that at least one door controller (1) and at least one actuator (4) are fastened on at least one side of a door body (2, 2a, 2b, 2c, 2d), and in said door controller (1) a high-frequency modulator (6) with a transmitting antenna (7), connected with a code selector (8), further a switch (9) of an actuator (4) and a power source (10) are fitted, while within the range of the waves from the high-frequency modulator (6) at least one performance unit (14) is situated, containing a high-frequency demodulator (15) with a receiving antenna (16), connected with an analyzing member (17) and with a switching member (18), incorporated in the electric circuit of at least one illumination body (20, 20a, 20b, 20c).
2. A device according to Claim 1, characterized in that the door controller (1) and the actuator (4) are fitted on both sides of a door body (2, 2a, 2b, 2c, 2d) directly below the door handle (5) of the door lock (3), while the switch (9) of the actuator (4) is connected with an arresting member (11), consisting of a contact (12) of a reed relay and of a permanent magnet (13).

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3. A device according to Claims 1 and 2, characterized in that the actuator (4) is a push-button switch (9).
4. A device according to Claims 1 and 2, characterized in that the actuator (4) is a contact sensor.
5. A device according to Claims 1 to 4, characterized in that a sensor (22) of ambient illumination is incorporated in the circuit of the analyzing member (17) of the performance unit (14).
6. A device according to Claims 1 to 5 characterized in that the analyzing member (17) of the performance unit (14) is connected with the electric circuit of at least one conventional switch (21).
7. A device according to Claims 1 to 6 characterized in that the high-frequency modulator is a transtransmitter of high-frequency waves.
8. A device according to Claims 1 to 6, characterized in that the high-frequency modulator (6) is a transmitter of infrared waves.
9. A device according to Claims 1 to 6, characterized in that the high-frequency modulator (6) is a transmitter of ultrasonic waves.

AMENDED CLAIMS

[received by the International Bureau on 03 September 1997 (03.09.97);
original claims 1-9 replaced by amended claims 1-6 (2 pages)]

1. A device for a wireless switching of illumination bodies (20, 20a, 20b, 20c), above all in flats and other enclosed rooms, consisting of a door-controller (1) with a signal generator and of a performance unit (14) situated within reach of control of said door controller (1) and coupled to a switching member (18) of at least one illumination body (20, 20a, 20b, 20c), c h a r a c -
t e r i z e d i n t h a t

said door controller (1) contains a high frequency modulator (6) with a transmitting antenna (7), to said high frequency modulator (6) being coupled a code selector (8) with an actuator (4),

said performance unit (14) contains a high frequency demodulator (15) with a receiving antenna (16), to said high frequency demodulator (15) being coupled, through an analyzing member (17), a switching member (18), incorporated in the electric circuit of at least one illumination body (20, 20a, 20b, 20c), and

at least one door controller (1) and at least one actuator (4) are fitted on both sides of a door body (2, 2a, 2b, 2c, 2d) directly below the door handle (5) beside a door lock (3).

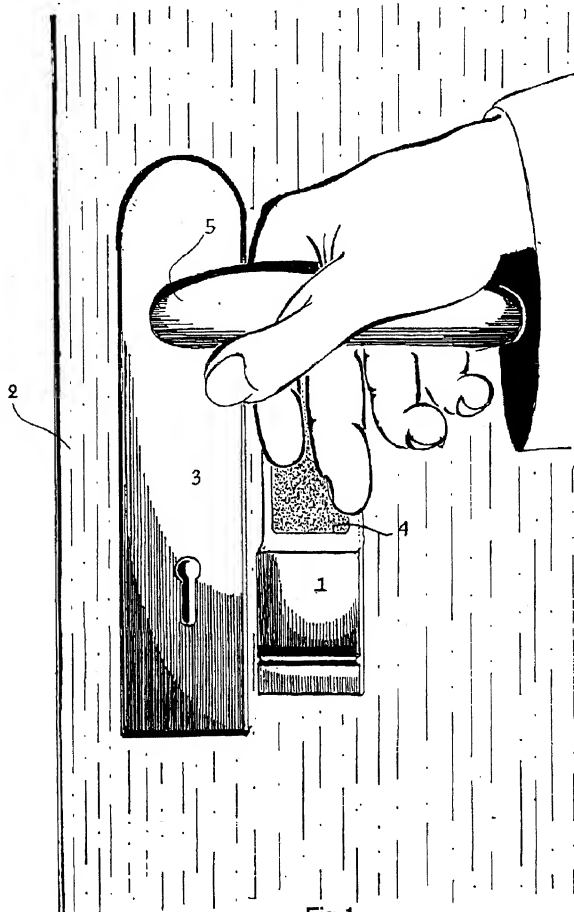
2. A device according to claim 1, c h a r a c t e r -
i z e d i n t h a t said actuator (4) is arranged within reach of a back of at least one finger of a hand clasping the door handle (5).

3. A device according to claim 1, characterized in that said door controller (1) is designed for cooperation with at least two performance units (14).

4. A device according to claim 1, characterized in that said door controller (1) is provided with a switch (9), coupled with an arresting member (11), consisting of a contact (12) of a reed relay and of a permanent magnet (13).

5. A device according to claim 1 to 4, characterized in that a sensor (22) of an ambient illumination is incorporated in the circuit of the analyzing member (17) of said performance unit (14).

6. A device according to claim 1 to 4, characterized in that said analyzing member (17) of said performance unit (14) is coupled with an electric circuit of at least one conventional switch (21).



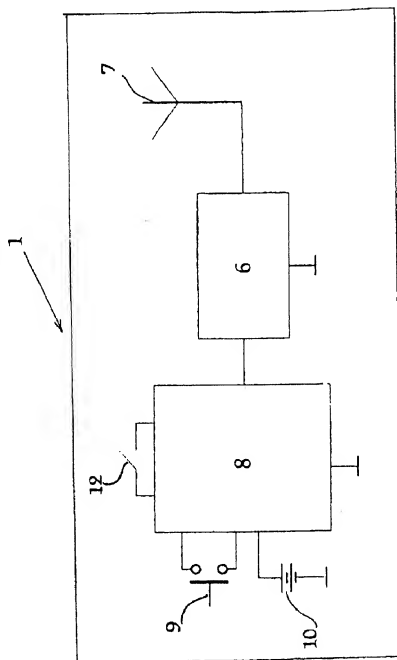


Fig. 2

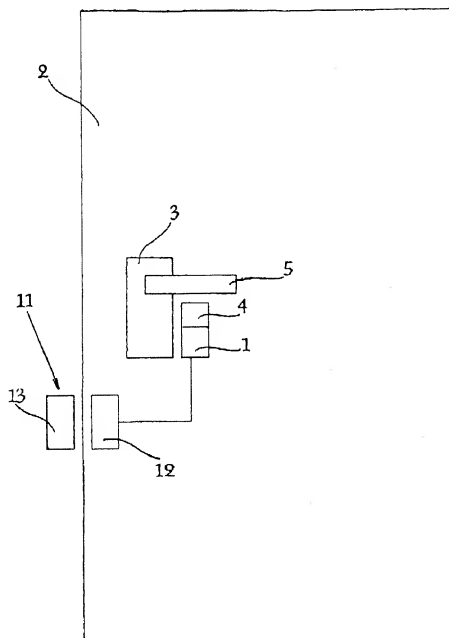


Fig. 3

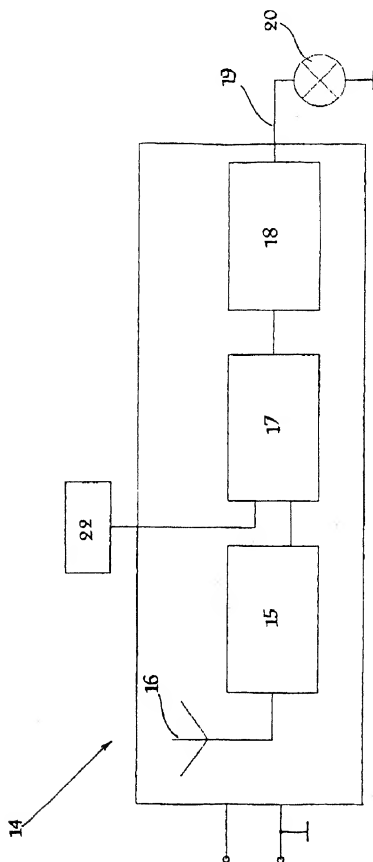


Fig. 4

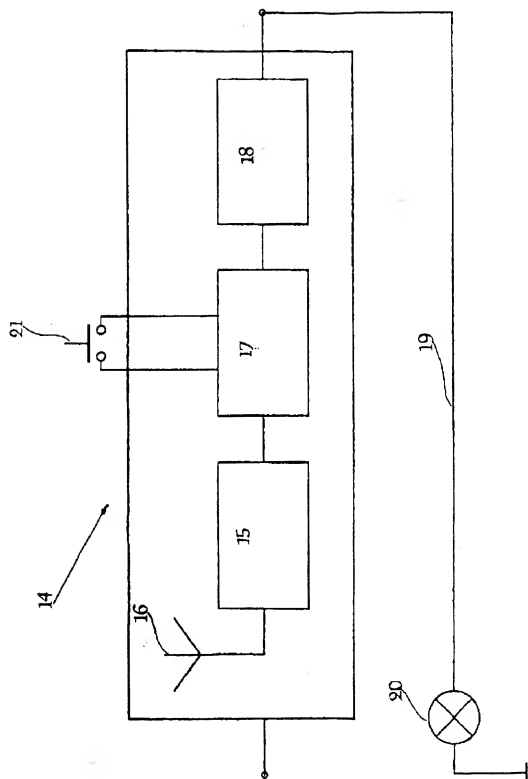


Fig.5

INTERNATIONAL SEARCH REPORT

Int'l. Application No.
PCT/CZ 97/08014A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H05B37/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbol)

IPC 6 H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 153 467 A (SIEMENS AG) 4 September 1985 see the whole document -----	1-9

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentmann 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx 31 451 epo nl,
Fax (+31-70) 340-3016

Authorized officer

VILLAFUERTE ABR., L

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/CZ 97/00814

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0153467 A	04-09-85	DE 3401108 A	18-07-85
		DE 3471126 A	16-06-88
